Commonwealth of Pennsylvania
DEPARTMENT OF PUBLIC INSTRUCTION
Harrisburg

Bulletin 101-A

Supplement To

STANDARDS, RULES AND REGULATIONS

Relating to

TRANSPORTATION OF PUBLIC SCHOOL PUPILS

(Effective October 15, 1939)

Adopted by
State Council of Education
March 31, 1939

Digitized by the Internet Archive
in 2016

https://archive.org/details/supplementtostan00penn

FOREWORD

This bulletin amends and supplements the publication released under date of February 4, 1938, entitled "Standards, Rules and Regulations Relating to Transportation of Public School Pupils".

The specifications contained herein were adopted by the State Council of Education on March 31, 1939, and apply only, to school buses purchased or placed into service on or after October 15, 1939. They are in no way retroactive with respect to buses which are now in use or which may be put into service prior to October 15, 1939. All such equipment will be subject to the regulations now in force; however, any equipment hereafter placed into use which meets the requirements herein set forth will be approved, subject to the provisions noted in the following paragraph.

The following requirements are contingent upon the approval by the General Assembly now in session of proposed amendments to Section 828 of the Motor Vehicle Code which conform to these requirements:

1. A-9-b - which requires all forward facing seats.
2. A-9-c - relative to seating space.
3. A-12-a - in regard to width of emergency door.

The administration of these requirements is a function of the Division of Consolidation and Transportation, Department of Public Instruction. All communications concerning them should, therefore, be directed to that Division.

LESTER K. ADE, President
State Council of Education

Commonwealth of Pennsylvania
DEPARTMENT OF PUBLIC INSTRUCTION
Harrisburg

Specifications Governing New School Bus Equipment Placed into Use After October 15, 1939

Definition of a School Bus:

A school bus is any vehicle which is owned by or used under contract with any school or school district for the purpose of transporting school children.

Classification:

Class A - Any school bus of bus type, excepting vehicles included in Class C.

Class B - Any vehicle with a body which has been built originally as a commercial vehicle, but has been equipped with seats for the purpose of transporting as a school bus.

Class C - Any vehicle which is operated under a school bus contract, in scheduled route common carrier service, over a route which has been designated on the Certificate of Public Convenience, issued by the Pennsylvania Public Utility Commission.

Class D - A conventional passenger car which is operated on a school bus contract, which accommodates not more than six high school or seven elementary pupils in addition to the driver.

Specifications:

Classes A & B	Pages 2 - 13
Class C	" 14
Class D	" 15

(OVER)

A. BODY (Classes A & B)

1. Construction

a. The body, including frame, roof, walls, and floor, shall all be of steel or other metal of comparable strength. A wooden floor is permitted to be used for insulation purposes provided a metal floor, which will not permit seepage of gasoline or fumes, is used above or beneath the wooden floor. A rubber, or composition floor covering is required.

b. There shall be no door to the left of the driver's seat. (Class B may be so equipped but may not be used while transporting pupils.)

c. Body posts and top must be strong enough to support load on turnover.

d. Body post interference with forward vision must be minimized. The use of a metal screen in a windshield or side window at any point in front of the face of the back of the driver's seat is prohibited.

e. Maximum overall width of vehicle permitted by law is 96 inches.

f. Maximum overall length of vehicle permitted by law is 33 feet.

2. Headroom

a. The minimum clear inside body height along centerline of body must be not less than 66 inches for Class A and 50 inches for Class B vehicles.

3. Entrance Door (Class A only)

a. A folding entrance door is required to the right of the driver with not less than 24 inches clear width between panels.

b. Glass lower panels are required on entrance door in order that a child standing along road shall be visible from dirver's seat.

c. A grab handle of not less than 10 inches length must be securely mounted at a convenient height inside the door when open to enable pupils to help themselves in getting in and out of the bus. A stanchion attached to the floor may be used for this purpose in buses using the split type door.

d. No entrance step shall protrude beyond side body line.

e. In a bus requiring two steps to enter from ground to floor the upper step must be not less than 13 inches, and not more than 15 inches rise except that, if the lower step is less than 16 inches from the ground, the upper step may have a rise of less than 13 inches. When three steps are required to enter the bus the upper two steps may be less than 13 inches rise but must be of equal height.

f. Control mechanism of entrance door shall be under sole control of driver.

g. Door control shall have no folding action, notches or holes which might cause injury to passengers.

h. Folding doors shall have rubber channel jambs to protect fingers of passengers.

i. A stanchion is required at left of doorway from roof to floor.

4. Windshield Wiper

a. Every school bus must be equipped with two separate power windshield wipers with manual control. Every wiper system operated by air pressure or engine vacuum must be equipped with an air or vacuum reserve tank of not less than 195 cubic inches capacity except when a direct connection exists with reserve tank of a power brake system.

b. Every bus must be equipped with an adequate defroster.

5. Rear Vision Mirrors

a. Every school bus must be equipped with a rear vision mirror so placed inside or outside the bus as to afford a view of the highway for 200 feet to the rear.

b. An inside mirror of minimum size of 4 x 15 inches is required to be so placed that the driver can conveniently observe the conduct of pupils.

c. One mirror can be used to meet the requirements of both "a" and "b" if of required size and placement.

6. Windows

a. Safety glass must be used wherever glass is used.

b. Adjustable metal frame safety-glass sash, or sashless safety glass, operating in grooves with provision for protection from the weather, are required of all movable windows.

c. On Class "B" buses only, stationary side windows may be used, provided the bus is equipped with adequate means of ventilation.

d. Windows at rear of any bus must be stationary.

e. The window at left of driver must be capable of opening to give arm signal and be without guard.

f. Class "B" only - There shall be a minimum window area excluding area of windshield of not less than 200 square inches per passenger.

7. Window Guards

a. The lower half of every window, which is capable of opening, must be protected to at least one half the greatest vertical height of the window between sills.

b. When window is recessed lower than one half the height between sills, a removable guard, either of mesh or rods, is required. This guard must be so constructed that it can quickly and easily be released from inside the vehicle, and it must be hinged at the bottom so as to drop clear of the window when released. This guard must be so constructed as to prevent the extension of hands and arms by pupils.

8. Window "stops"

a. "Stops" may be used to prevent opening of windows lower than one half the window height between sills. Under such conditions the installatio of other window guards is not required.

9. Seating

a. Seating capacity of every school bus is listed on windshield sticker.

b. Every school bus, which is put into service after October 1, 1939, must be equipped with all forward facing seats. (This section is contingent upon amendment of Section 828 of the Vehicle Code in the 1939 session of the General Assembly)

c. No jumper or other floating seats are permitted.

d. Every seat cushion must be equipped with springs and every seat back must be well padded.

e. A minimum lineal seating space of not less than 13 inches per passenger is required. In computing seating capacity, no allowance will be made for fractional amounts. All measurements will be taken along central axis of seat cushion. (This section is contingent upon amendment of Section 828 of the Vehicle Code in the 1939 session of the General Assembly.)

f. The minimum depth of all seat cushions shall be not less than 14 inches from front to back, and all seats shall measure not less than 12 inches from front edge of cushion to foremost face of seat back when cushion is in place.

g. The minimum center to center spacing of forward facing seats shall be 24 inches.

h. All seats must be fastened rigidly to the bus and recessing of frame of seat back at seat level on aisle side is prohibited.

10. Driver's Seat

a. No part of the body of any passenger when seated may be on, alongside of, or in front of the driver's seat.

b. On every Class "A" bus, a stanchion is required to the right rear of the driver's seat.

c. On every Class "A" bus a guard rail or other protective device is required extending from the above stanchion to the rear and left of the driver's seat to the left wall of the bus body.

11. Aisles

a. Every entrance aisle must have a minimum clear width of not less than 12 inches.

b. Aisle leading to emergency door must have a minimum clearance of not less than 12 inches.

c. Aisles must be unobstructed.

12. Emergency Door

a. Emergency door must not be less than 20 inches wide.

b. An emergency door is required in the rear or on the left side near the rear.

c. The emergency door must have a clear height of not less than 48 inches for Class "A" and 46 inches for Class "B" vehicles.

d. No outside steps to the emergency door are permitted which can be used when the emergency door is closed.

e. A fastening device, which is not under the control of the operator, is required, which can be quickly operated by pupils in an emergency, but is protected against accidental release.

f. No handle, bolt, latch, or other fastening device may be used on the outside of an emergency door.

13. Ventilation

a. Unless an adequate indirect ventilation system is used, roof ventilators are necessary. Where roof ventilators are required a vehicle of less than 2,000 pound chassis weight must be equipped with one ventilator; a vehicle from 2,000 to 3,000 pound chassis weight must be equipped with two ventilators; and a vehicle above 3,000 pound chassis weight must be equipped with three ventilators.

b. No vents are permitted on rear of bus body.

14. Fire Extinguisher

a. Fire extinguisher, bearing approval of Underwriter's Laboratories, containing an agent not subject to freezing of not less than one quart capacity, must be mounted within reach of the driver.

b. Fire extinguisher must be tested by inspection officer prior to issuance of "Approved School Bus" sticker and must be kept fully charged at all times.

15. Hand Axe

a. A small hand axe of a type that can be conveniently used to break safety glass must be mounted at some accessible point inside the bus.

16. Interior Lights

a. A system of interior lighting must be in use, using dome lights of standard type controlled from driver's seat.

17. Heater

a. An adequate heating system using a hot water heater is required. Every Class "A" bus must be equipped with a bus type heater.

b. No heater, burning gasoline vapor, kerosene, or other fuel, may be used.

c. No heater may be used which depends upon heat supplied by contact of incoming air with exhaust manifold, muffler or exhaust pipe.

18. Radio

a. No Class "A" or Class "B" bus may be equipped with a radio.

19. Trailer

a. No school bus may pull a trailer of any description.

20. Baggage

a. Freight, baggage or merchandise of any kind may not be carried while the vehicle is transporting pupils, excepting property of passengers or school district. Book racks should be provided.

21. Advertising

a. No such vehicle may display any advertising sign, inside or out.

22. Chains

a. Every such vehicle must carry a set of chains which fit rear wheels and must use them in slippery, icy weather.

b. Chains are required only for outside wheel of dual rear wheels.

23. Flags and Flares

a. Every such vehicle must carry three flags and three approved flares as required by law and in event the vehicle is disabled, display them immediately for the guidance of other traffic.

24. Tools

a. Necessary tools for minor repairs must be carried.

25. Paint

a. Every such vehicle, including body, hood, and fenders, must be painted orange in color, of a shade approximating sample which is furnished all County Superintendents. Anyone can secure a sample by requesting same of Division of Consolidation and Transportation, Department of Public Instruction, Harrisburg, Pennsylvania.

26. Labels

a. Every school bus shall be labeled on the front and on the rear using black, block letters not less than 6 inches in height with the words "SCHOOL BUS" showing on the outside.

b. Every emergency door shall be labeled as such both outside and inside using black letters at least three inches high stating "EMERGENCY DOOR".

c. Every school bus of Class "B" type, which is used for purposes, other than school bus transportation, must be equipped with detachable covering which will be used to cover the "School Bus" sign on front and rear when the vehicle is in use for other than school transportation purposes.

27. Trim

a. The use of black side belt panels or trim is permissible so long as the main section of the black belt panel does not exceed 9 inches in width.

b. Side belt panels may be lettered with name of school or school district and may be painted any color.

c. Use of an aluminum painted roof is permitted provided that aluminum paint does not extend below roof moulding.

d. No trim of other color than approved orange may be used on front or rear of bus at any point which may be observed by the driver of an approaching car, with the exception that black trim line not wider than 2 inches may be used as a part of the general color scheme.

28. Rub Rail (Class A only)

a. A single member or a continuous series of longitudinal frame members must be used, of concealed construction, between floor and window ledge on both sides of body to reinforce body and withstand possible lateral impact.

b. An adequate rub rail is required on the outside of the body to be installed not higher than the seat line on both sides. A "pressed in" rub rail does not satisfy this requirement.

29. Running Lights

a. The following lights are required by the Vehicle Code to be installed on all, or certain types of school buses; head lamps, rear lamps, identification markers, side markers, clearance lamps, direction indicator and rear reflector.

b. Complete information on the above items can be found in the Digest of the Vehicle Code. A copy of the Digest can be obtained free by addressing your request to the Pennsylvania Bureau of Motor Vehicles, Harrisburg, Pennsylvania.

c. Recessing of rear registration plate and rear lamp is required on all new buses (Class "A").

30. Stop Lamps

a. Not less than two stop lamps must be installed on the rear and these must be in operating condition on every Class "A" school bus.

b. There must be at least one stop lamp installed and in operating condition on the rear of every Class "B" school bus.

c. When one or more stop lamps are used on the front of a school bus, the lens of these lamps must be amber in color.

B. CHASSIS (Classes A & B)

1. Passenger Load

a. Every school bus is restricted to a total passenger load not to exceed one passenger for every 90 pounds certificated chassis weight without cab as certified by chassis manufacturer.

b. No school bus may be used with a seating capacity in excess of 60 pupils.

c. No Class "B" school bus may be used to transport more than 12 passengers

2. Distribution of body length on conventional truck and bus chasses

a. Not more than 1/3 total body length may be placed to rear of center of rear axle.

b. Front body length is measured from face of dash to point over center rear axle.

c. Rear body length is measured from rearmost point inside body at belt level to point over center rear axle. In cases where a sedan type seat is placed entirely across rear of bus, overall depth of seat is added to floorline measurement to obtain rear body length.

3. Distribution of body length on special truck and bus chasses

a. In the case of buses with front engine mounting using two rear axles, front and rear body lengths are measured to a point midway between points over centers of rear axles.

b. Front body length on cab over engine models is measured from foremost face of dash at point where body joins cowl to point over center rear axle.

c. Front body length on metropolitan models is measured from foremost face of dash of body to point over center rear axle.

d. Front body length of transit or "pusher" models is measured from point over center front axle to point over center rear axle.

e. Rear body length of transit or "pusher" models is horizontal distance measured outside buss from point over center rear axle to rearmost point of engine housing.

4. Cutting of Frame

a. Cutting and/or splicing of original chassis frame is not permissible in front of rear hanger of rear spring.

b. Rear axle may be moved backward not more than 12 inches provided rear spring hanger is not moved past end of original frame. When rear axle is moved backward from original position a reinforcing member must be attached to each longitudinal member of frame, the front of which must extend to a point not more than 40 inches to rear of inner face of dash.

5. Body Support

a. Rearmost point inside body at floorline may not extend more than 12 inches beyond chassis frame.

b. When an extension of any type is used to meet requirements for body support, its longitudinal members must extend forward of end of original frame for at least the distance of overhang of the extension. Such an extension must be securely attached to original frame by riveting or welding, or both.

6. Service Brakes

a. Service brakes are required to act on every wheel of all new vehicles under the provisions of the Vehicle Code.

b. Service brakes shall be capable of stopping the fully loaded vehicles within 30 feet from a speed of 20 miles per hour on a dry level surface. (Vehicle Code)

c. Every school bus, having a certificated chassis weight in excess of 3,000 pounds (Class T registration or heavier) must be equipped with power brakes, either vacuum or air actuated. These power brakes may be either of the full actuation or assistor type.

d. A reserve tank must be used of not less than 1,000 cubic inches volume to insure that the vehicle can stop with full load within 30 feet from 20 miles per hour with engine stopped and clutch disengaged.

7. Emergency Brake

a. An emergency or parking brake, acting separately from the service brake system, is required on every vehicle. (Vehicle Code)

b. The emergency or parking brake is required to stop the vehicle on a dry level surface in 55 feet from a speed of 20 miles per hours. (Vehicle Code)

c. The emergency or parking brake is required to hold the fully loaded vehicle stationary on any grade upon which it is operated. (Vehicle Code)

d. Every school bus, which is equipped with an emergency or parking brake acting directly on the driveshaft, must also be equipped with a shaft guard to prevent "whip" of the shaft in event it breaks between brake and flywheel.

8. Springs

a. An adequate front and rear spring suspension is required to provide a safe and secure axle mounting at all times.

9. Driveshaft Guards

a. A suitable guard or guards must be installed on every school bus to prevent damage to any part of the service braking mechanism, or gasoline feed line, or electrical system, in case of failure of either jackshaft or driveshaft.

10. Tires

a. Every school bus must be equipped with tires not less in size than those recommended by the chassis manufacturer.

b. Under any condition, buses of the various chassis classifications are required to be equipped with tires of a minimum size shown on table on page 13.

c. Every vehicle of U classification or heavier must be equipped with dual rear wheels.

d. Tires are required to be the same size on front and rear.

e. Every school bus must be equipped with a spare tire in operating condition.

f. No tire may be used when worn so that tread groove is less than 1/8 inch deep. Regrooving is permissible provided the fabric is not bared at any point.

11. Gas Tank

a. Gas tank must be located, filled, drained, and vented outside passenger compartment.

12. Exhaust Tail Pipe

a. Exhaust tail pipe must be protected by an intervening metal shield at any point where it is within 12 inches of the gasoline tank and must terminate at a point at or beyond the extreme end of body.

13. Bumpers

a. Bumpers must be anchored rigidly front and rear to truck chassis.

b. Rear bumper of Class "A" buses must be wholly shielded over the entire length so as to prevent standing or hanging thereon, or hitching thereto.

C. ENGINE (Classes A & B)

1. Type

a. Engine must be of type and capacity recommended by manufacturer of chassis for maximum load which bus will transport.

2. Governed Speed

a. Every such school bus must be equipped with a governor in good operating condition.

b. The governor of any vehicle, having a chassis weight of 3,000 pounds or above, must be set to permit an engine speed of not more than 2,800 revolutions per minute.

c. In every case, the governor shall be set to restrict road speed to not more than 35 miles per hour in the highest forward gear.

3. Generator

a. The generator must be adequate to operate all required lighting devices and heater and still keep battery on charge.

4. Battery

a. Battery must be adequate to meet requirements of vehicle.

D. PERFORMANCE FACTOR (Classes A & B)

1. a. Every new school bus must be so geared as to be capable of surmounting a 3% grade on continuous grade at 20 miles per hour in high (direct) gear.

2. a. The use of a school bus equipped with an auxiliary transmission or other form of overdrive, or underdrive, is prohibited.

b. When a two speed rear axle is used, the numerical value of the least powerful ratio in high (direct) gear must be used in computing the performance factor of the unit.

3. a. For the purpose of computing the performance factor the following formula shall be used:

$$\frac{T \times R \times E \times 12}{TRL \times GW} - .015 \text{ (rolling resistance of second class road)}$$

maximum grade in % which vehicle will surmount in high gear.

b. T or net torque is the maximum value from flat part of power curve certified by the manufacturer with all accessories, ready for the road.

c. R or rear axle ratio is the highest gear reduction present in overall gearing.

d. E or efficiency is .9 for standard and .85 for worm drive vehicles.

e. TRL or tire radius loaded may be taken from the tire table on page 13.

f. GW or gross weight is determined by adding weight of pay load to empty weight of chassis and body.
(1) Chassis weight is certified to Bureau of Motor Vehicles by manufacturer.
(2) Weight of body and chassis can be obtained by weighing empty bus.
(3) Weight of pay load is estimated by computing seating capacity and multiplying by a value of 125 pounds for each pupil.

See example on page 12

EXAMPLE OF COMPUTING PERFORMANCE FACTOR

What is the performance factor of a 1939 Ford school bus having a wheel base of 191 inches, using a Model 85 engine, equipped with 7.50 x 20 tires and dual rear wheels, carrying a body with a weight of 3720 pounds and having seating accommodations for 45 pupils?

T = 150
R = 6.67
E = .9
TRL = 17.1

Chassis weight	4038
Body weight	3720
Payload (45 x 125)	5625
	13,383

$$\frac{150 \times 12 \times 6.67 \times .9}{17.1 \times 13{,}758} = \frac{10{,}805.4}{228849.3}$$

12 × .9 = 10.8
66.7 × 756 = 648 + 648 = 72,036

72.036 × 150 = 3601800 + 72036 = 10,805.400

13.383 × 17.1 = 936 81 + 13383 = 2288493

$$228849.3 \overline{)10805400} = 4.72$$

9153972
16514280
16019451
494829

= 4.72 - 1.5 (rolling resistance factor)

= 3.22 performance factor

Applying this formula to the same set of conditions using the Ford Mercury engine which has a net torque of 173, we find the performance factor as follows:

72036 × 173 = 216108 + 504252 + 72036 = 12462228

$$228849.3 \overline{)1246228} = 5.44$$

11442465
10197630
9153972
1043658

Performance factor is 5.44 - 1.5 = 3.94

TABLE OF MINIMUM TIRE REQUIREMENTS
AND TIRE LOADED RADII FOR NEW SCHOOL BUSES

CLASS OF REGISTRATION	CHASSIS WEIGHT	MAXIMUM GROSS WEIGHT	TYPE OF REAR WHEELS	LOW PRESSURE				
				RIM	WHEEL	NUMBER PLIES	CAPACITY	TIRE RADIUS LOADED
S	2,000# to 3,000#	7,000#	Single	6.50	16	6	1,290	13.7
			Single	7.00	15	6	1,300	13.7
T	3,000# to 4,000#	11,000#	Single	8.25	20	10	2,650	17.9
			Dual	7.00	20	8	1,950	16.7
U	4,000# to 5,000#	13,000#	Dual	7.50	20	8	2,200	17.1
V	5,000# to 6,000#	18,000#	Dual	8.25	20	10	2,650	17.9
W	6,000# to 7,500#	22,000#	Dual	9.00	20	10	3,250	18.5
				HIGH PRESSURE				
S	2,000# to	7,000#	Single	No high pressure equivalent				
					No high pressure equivalent			
T	3,000# to	11,000#	Single	7	34	10	2,800	17.6
			Dual	6	32	8	1,950	16.1
U	4,000# to 5,000#	13,000#	Dual	6	32	10	2,200	16.8
V	5,000# to	18,000#	Dual	7	34	10	2,800	17.6
W	6,000# to 7,500#	22,000#	Dual	8	36	12	3,600	18.6

REQUIREMENTS CLASS "C" - Scheduled Common Carrier

1. Vehicle must be in good mechanical condition.

2. Body must be weather tight. Leaks in roof or side walls constitute cause for rejection.

3. Vehicle must be equipped with lights, brakes, and other equipment in accordance with Vehicle Code.

4. Aisles must be unobstructed.

5. Floor must be gas tight and in good condition. An insulating floor covering in good condition is required.

6. Upholstery must be clean and in good condition.

7. Seating capacity will be computed in 13 inch units. In the case of single or "bucket" seats no credit will be allowed for fractional amounts of seating space. "Jumper" seats are not permitted.

8. Any damaged windshield, or rear or side windows must be replaced immediately, using approved safety glass.

9. The vehicle must be as safe, as convenient, and as comfortable as the individual circumstances permit.

10. Every such vehicle must display an "Approved School Bus" sticker listing thereon the seating capacity before transporting pupils under an approved contract or for reimursable fares.

REQUIREMENTS CLASS D - Conventional Passenger Vehicles

1. Such a vehicle must be of a construction using all metal frames and walls, of sufficient strength to support weight of car on turnover. Only vehicles which are closed to the weather may be used. Roadsters and touring cars may not be used.

2. A minimum lineal seating space of not less than 13 inches per passenger is required. The minimum depth of seats required is 12 inches.

3. Chains to fit rear tires must be carried.

4. Tools for emergency repairs must be carried.

5. The vehicle must be equipped with stop light in operating condition.

6. The vehicle must be equipped with four wheel brakes.

7. No tire may be used when rubber is worn so that tread groove is less than 1/8 inch deep.

8. An adequate hot water heater is required.

9. Automobile radio may not be used while transporting pupils.

10. A sign must be displayed not less than 30" x 6" in size, bearing the label "SCHOOL BUS" in square black letters, not less than 4" high on approved orange background showing to front and rear while transporting pupils.

3083